➔ ESSENTIALS:
Automation supports the
development of Paris into
a sustainable metropolis

V I V E

4
**additional
lines**

200 KM
**of new
railway lines**

The Grand Paris Express
is part of the Grand Paris
project announced in 2007,
under Nicolas Sarkozy's
presidency, to develop
Greater Paris into a sustain-
able metropolitan area

The Grand Paris Express is not just a transportation project. It is an eco
Paris' position as one of the most attractive cities in the world. Automa

Grand Paris express — L A VITESSE

nomic, social, urban, and environmental plan, which will strengthen

tion plays a crucial role at the "construction site of the century."

LINE 14, PARIS METRO. Anyone standing at the front is speeding into the void: leaning on the glass, staring into the dark tubes, while rushing from station to station – no driver, fully automatic, remote-controlled – as if by itself. The passenger at the front probably doesn't think that line 14 is just the beginning of something bigger. But, hasn't Paris always been a place for big ideas? The Eiffel Tower, the Louvre, the La Défense business district to the west of the city?

For most people, however, the 14 – which opened in 1998 – is just a subway line linking Saint-Lazare with the Olympiades. And yet it is much more. It is the base for the Grand Paris Express, currently Europe's largest infrastructure project. The northbound driverless train line will be extended to Saint-Denis Pleyel by 2023 and will offer connections to lines 15, 16, and 17, which will all become part of the Grand Paris Express system. In the south, the route to Orly Airport via
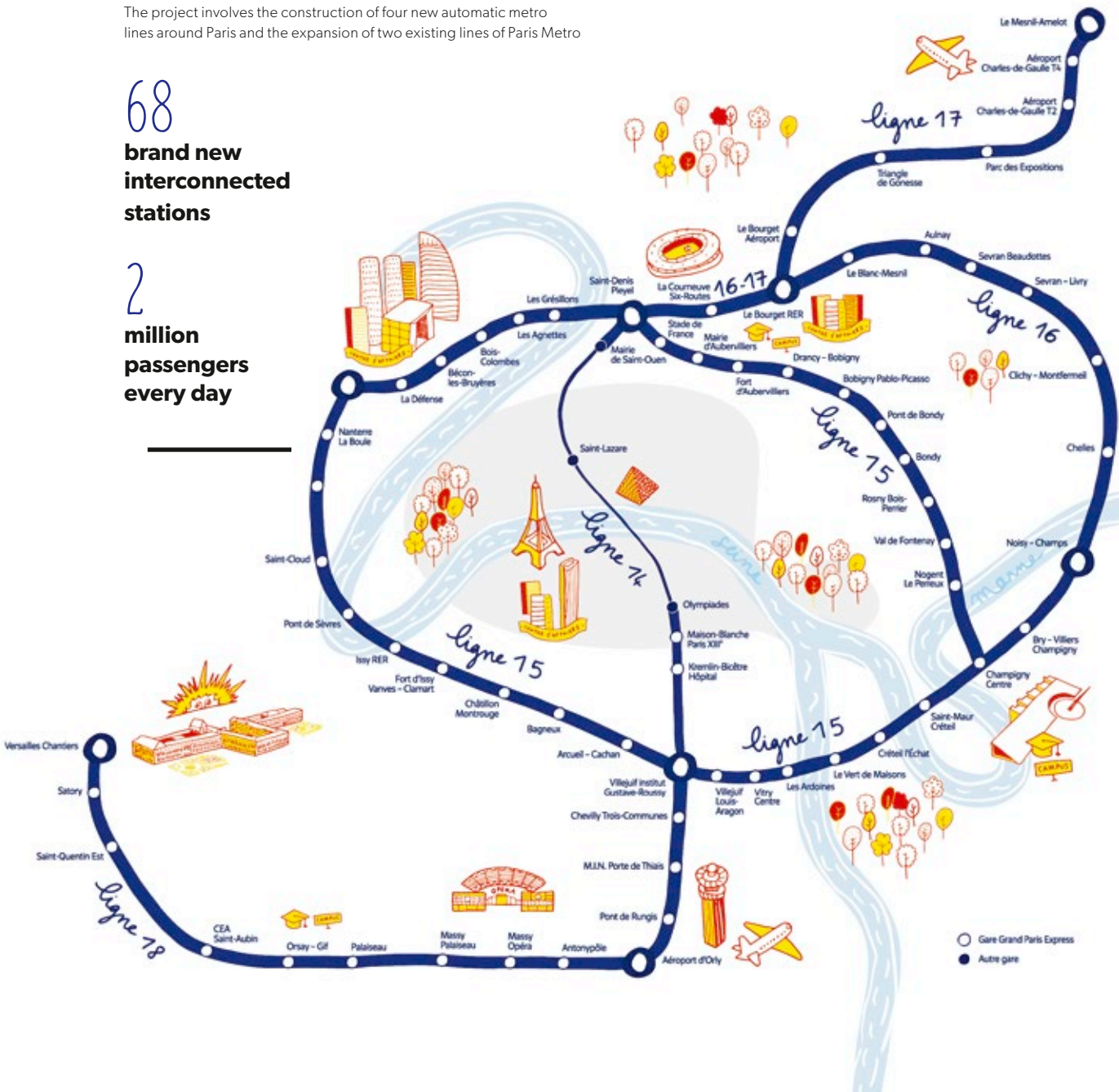
CRISSCROSSING THE PARIS REGION

The 200km rapid transit network is located in Ile-de-France, France. The project involves the construction of four new automatic metro lines around Paris and the expansion of two existing lines of Paris Metro

68
brand new interconnected stations

2
million passengers every day

ligne 17

ligne 16

ligne 15

ligne 14

ligne 15

ligne 18

Le Mesnil-Amelot
Aéroport Charles-de-Gaulle T4
Aéroport Charles-de-Gaulle T2
Parc des Expositions
Triangle de Gonesse
Aulnay
Sevran Beaudottes
Sevran – Livry
Le Blanc-Mesnil
Le Bourget Aéroport
Le Bourget RER
La Courneuve Six-Routes
16-17
Clichy – Montfermeil
Drancy – Bobigny
Bobigny Pablo-Picasso
Chelles
Pont de Bondy
Bondy
Rosny Bois-Perrier
Val de Fontenay
Noisy – Champs
Nogent Le Perreux
Bry – Villiers Champigny
Champigny Centre
Saint-Maur Créteil
Créteil l'Échat
Le Vert de Maisons
Saint-Denis Pleyel
Les Grésillons
Les Agnettes
Bois-Colombes
Bécon-les-Bruyères
La Défense
Nanterre La Boule
Saint-Cloud
Pont de Sèvres
Issy RER
Fort d'Issy Vanves – Clamart
Châtillon Montrouge
Bagneux
Arcueil – Cachan
Villejuif institut Gustave-Roussy
Chevilly Trois-Communes
M.I.N. Porte de Thiais
Pont de Rungis
Aéroport d'Orly
Antonypôle
Massy Opéra
Massy Palaiseau
Palaiseau
Orsay – Gif
CEA Saint-Aubin
Saint-Quentin Est
Satory
Versailles Chantiers
Saint-Lazare
Olympiades
Maison-Blanche Paris XIII°
Kremlin-Bicêtre Hôpital
Villejuif Louis-Aragon
Vitry Centre
Les Ardoines
Stade de France
Mairie de Saint-Ouen
Mairie d'Aubervilliers
Fort d'Aubervilliers

○ Gare Grand Paris Express
● Autre gare

V L Y I N G   HIGH

THE LANDING PLATFORM with a huge, white V, sticks out into the void from the rooftop of that futuristic skyscraper. It resembles a cable-car station – just without a cable and a car. They call it a "Volo-Hub", as this is where the aircraft – or "Volocopters" – should be landing and taking off every 30 seconds, and where they are moved inside the Volo-Port. "This means that the landing site is free for the next aircraft in a very short time," says the company's co-founder and CIO Alexander Zosel (pictured right). And it means that passengers alight the aircraft protected from wind and weather and that battery packs will be swapped automatically in a protected area by robots, before moving on to the section where passengers embark for take-off.

The video looks a lot like a vision of the future, but it could be an everyday reality in less than ten years. "Air taxis will become another component of local public transport and thus relieve the entire system in megacities," says Zosel. He expects the first full Volocopter air taxi systems with dozens of Volo-Hubs and Volo-Ports to be in place within the next ten years, capable of flying 100,000 passengers an hour to their desired destination. "Once operating to its full potential, flying won't be significantly more expensive than taking a cab, but it will be significantly faster," Zosel says.

Using its own hubs, Volocopter wants to connect vital intersections – like airports or business parks – with city centers. The autonomous aircrafts, taking off every minute, could relieve the strain on particularly congestion-prone areas like bridges, tunnels, ring roads, or feeder roads and promise to be cheaper to operate than conventional aerial mobility alternatives. But: "Our ambitions do not end with developing the aircraft," says Florian Reuter, CEO at Volocopter, "we are here to develop the entire ecosystem making air taxi services a reality across the world. This includes the physical and digital infrastructure to manage unmanned systems."

AN ECOSYSTEM FOR UNMANNED AIRCRAFT

Today, 55 percent of the world's population live in urban areas, a proportion that is expected to increase to 68 percent by 2050, according to the UN Department of Economic and Social Affairs. Projections show that urbanization combined with the overall growth of the world's population could add another 2.5 billion people to urban areas by 2050, with close to 90 percent of this increase taking place in Asia and Africa, according to a new United Nations data set launched in May. And they all want to be increasingly mobile. A tendency that will drive contemporary models of mobility to their limits, mobility for the future must therefore tread new paths to find solutions, with the Grand Paris Express project and Volocopter being two of them.

About Volocopter
German Volocopter GmbH develops vertically launching, fully electrical multicopters for the transport of people and of heavy lifting cargo drones. In 2016, Volocopter was granted a provisional license for a two-seater Volocopter by the German aviation authority and in 2017 the aviation start-up entered into an agreement with RTA Dubai over the global premiere of an autonomously flying air taxi.

Stéphane Kirkland, City Executive, Paris at Arcadis: "GPE is restructuring the future mobility equation for the whole urban area"

Thierry Dallard, Head of the Sociéte du Grand Paris board (picture below): "The Grand Paris Express is set to be a cradle for innovation"

Maison Blanche will also be extended to connect to ring line 15. Completion is planned for 2027.

Voilà, c'est le GPE, short for Grand Paris Express. One of ten projects to develop the French conurbation in the middle of the Ile de France into a metropolitan region, similar to Greater London. "The Grand Paris Express is set to be a cradle for innovation that will drive the transport and development projects forward," says Thierry Dallard, chairman of the Sociéte du Grand Paris' board, which is planning and managing the project. The GPE focuses on the fundamental rethinking and redesign of the public transport network, which will match the scale of the metropolitan area.

MORE MULTIMODAL, MORE INTEGRATED
The purpose of this exercise is to provide Grand Paris with multimodal transport solutions and more integrated transport services, thus supporting a model for polycentric development. "From the eco-design of stations to the energy efficiency of the metro and the high-speed fiber-optic network, the Grand Paris Express will be a tremendous innovation accelerator, fueling the economic development and influence of Grand Paris throughout the world," Dallard continues.

That sounds good in theory. Practically speaking, the GPE is intended to function as an automated transit network. With its 68 new stations and 200 kilometers of additional tracks, the Grand Paris Express consists of a ring route around Paris (line 15) and lines connecting developing neighborhoods (lines 16, 17, and 18). The four new lines circle the capital and provide connections with Paris' business districts, research clusters, and three airports. These fully automated, driverless trains will run on the new network at an average speed of 60km/h, nearly double that of the current Paris Metro network.

Parisians will experience first hand the effects of the new line construction, which began in June 2015 and will be carried out in phases until 2030, because it is projected to have a daily ridership of 2 million passengers by 2026. It is estimated that it will remove approximately 150,000 cars from the congested roads of the French capital. Up to 20,000 direct jobs are expected to be created every year of the project's duration. And, to be more precise in terms of efficiency and time saving, it will take 34 minutes, rather than 53 to get from Roissy Charles-de-Gaulle Airport to La Défense. Or, it will take 15 minutes, instead of 66, to get from Orly Airport to the Paris Saclay University Campus.

RESTRUCTURING THE MOBILITY EQUATION
But GPE does even more. "For the first time it will offer wider mobility options to people living outside of the historical city center, while creating new mobility hubs and restructuring the future mobility equation for the whole urban area," says Stéphane Kirkland, city executive, Paris at Arcadis. The global design and consultancy firm for natural and built assets

A train every

2 to 3 minutes

A 100% automatic metro system

The project is estimated to remove approximately 150,000 cars from Paris roads by having a daily ridership of 2 million passengers by 2026

90%
of lines will be built underground

Up to 20,000 direct jobs are expected to be created each year during the project's implementation

is involved in all project and program management services, providing technical consulting, and also manages the interfaces with other parts of the Parisian transportation system. "Saint-Denis Pleyel, for example, is going to develop from just another marginal spot along the railroad tracks to one of the biggest interconnections in Europe, linking rail, metro, GPE-lines, buses, and individual modes of transport," says Kirkland.

What is most intelligent about it is, that it is a better way of using the given territory, Kirkland goes on. "We have a very dense and dynamic center, but we make poor use of the highly valuable real estate surrounding it." So, the project should have a huge territorial effect, increasing the value of all the land around. "And all of these GPE-hubs are tying together, connecting existing pieces of infrastructure and

pushing other forms of intermodality. For me, the very fact of weaving the network as densely as possible is helping to prepare the future of mobility as a service."

A DIGITAL METRO HIGHWAY
Crisscrossing the Paris region, the Grand Paris Express will encourage people to switch from individual trips to public transport. This will not only help to mitigate greenhouse gas emissions and clearly contribute toward a more environmentally friendly capital region (the Grand Paris Express

will save up to 27.6 million tons of CO2 emissions by 2050). As it is conceived of and built as a "platform," GPE is at the same time putting more options in the hands of users, as well as opening up future possibilities for the technologies that come on top of that. And it provides an opportunity to harness new synergies between digital technology and transport.

Traversed by a pipeline of optic fibers and equipped with data centers and cutting-edge wi-fi and mobile networks, the Grand Paris Express is also aiming to be the most digitally advanced metro service in the world. Thanks to this digital highway, users, companies, and local authorities will have access to a plethora of new, collaborative, and customized open-data services.

In short, it's a generational project, or, as Thierry Dallard puts it, "the construction site of the century." ✕

FOCUS ON ADDED VALUE

In the future, mobility will require solutions that are as convenient as they are secure, for both transportation entities and passengers alike. Mònica Riera Willius, of Giesecke+Devrient Mobile Security, discusses securing digital identities in a constantly changing market.

Future mobility demands that transferring from one mode of transportation to the next be as fast and as easy as possible. What is the most sensible way for technology to deal with this modal split?

MANY DIVERSE PARTIES have to come together to address this: transportation authorities, city planners, politicians, administrators, mobility service providers, car manufacturers. After all, switching from one mode of transport to the next is not a one-man show, but quite a complex system. And, since the elements of trust and security will be crucial in an increasingly mobile and digital world, we see ourselves as the "creator of confidence" in this overall picture. Take millennials, for example: this target group has become accustomed to being able to obtain secure access to nearly all information, online content, exact booking, and one-stop shopping on mobile devices everywhere and any time. So, users are "picked up" securely, in the truest sense, not only by a vehicle, but also by their apps!

Diverse parties at the table, the fast-changing needs of mobile target groups – how and where does G+D Mobile Security begin to bring the different stakeholders together?

PUBLIC TRANSPORTATION IS, in fact, going through a challenging period. The world's population is growing, urban sprawl is increasing, and the role of transportation is changing. All the more reason to rely on our experience. After all, we've been a part of this transformation for three decades, from paper tickets to contactless smart cards. We're always developing ways to manage a higher flow rate of passengers, while at the same time ensuring that payments are secure. We can dip into our pool of proven ideas about efficiency and security to apply our know-how proactively, today and in the future, to the debate about "mobility" and "mobility as a service" – going far beyond mere ticketing.

Does that mean that, in the future, multimodal mobility will be built around customers?

IN A WORLD where mobility is a service, smart ticketing remains a central aspect. But since mobility has now outstripped the simple process of moving people and goods, we are also expanding our portfolio of solutions, in cooperation with our clients. From car and ride sharing, to door-to-door transportation services, to the question of managing and providing identities, we can deliver the technological foundation, including security mechanisms. Our goal is always to put our customers first, and to secure and manage their digital identities as well as possible. We no longer define ourselves solely through technology, but – increasingly – also through the added value and convenience we create for customers.